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end of the bog comes in contact with the high land, and that it is for some distance parallel with it, that it is long and relatively narrow, and that on the side away from the higher land it sinks down to a large bog of the flat kind. I think it extremely probable that a huge cold spring (or a line of them) comes out from the high land at the upper end of the bog, and the water then flows along toward its lower end on the bottom, being soaked up as it goes. The bog then grows and carries up the water sponge-like with it, and when off to one side the influence of the spring diminishes and is finally lost, the ordinary bog conditions begin to prevail. All this is confirmed by the fact of which Mr. Boardman assures me, that there flows out from its lower end a brook of clear, cool water, large enough so that in times past it has turned the wheel of a mill. Water of this character does not flow from common bogs and a spring origin seems necessary to account for it.

One other point remains to be explained. Why are they treeless and shrubless? This I believe to be due to the coldness of the water supplied by the springs. The temperature is too low for the growth of the roots of shrubs or trees. Its coldness has been already referred to; even at a depth of but a few inches this was very marked. It is perhaps, too, a point of importance that the bog bears in greatest profusion the cloud-berry, *Rubus Chamæmorus*; so abundant is it that the inhabitants resort to the bog with pails and gather it in great quantities. This northern plant finds so congenial a home but rarely in these latitudes, and seems to point to the cold conditions prevailing in the bog. I advance this explanation but tentatively. Perhaps some of our botanists who take their outing in that favored region will give it their attention.

*Harvard University, Cambridge, Mass.*

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### Notes on the flora of the St. Croix region.

E. J. HILL.

(Concluded from p. 113.)

The rest of the time in the St. Croix region was given to the Chesago Lakes, situated a few miles west of Taylor's Falls. Three days of the early part of September were mainly devoted to an examination of the water-plants, or to those of

the immediate shore. The body of water designated as above, or more often in the singular number, is made up of three principal sheets of water joined by narrow straits, and with numerous small bays indenting from its shores. On a tongue of land projecting from its eastern side is the village of Center City, the county seat of Chesago county, ambitious in name but diminutive. This was my stopping place, in the midst of a population almost wholly Swedish. There were fine farms around, and the many goodly farm buildings showed thrift and comfort. When one strolled into the fields and woods, there was a strong reminder of Ohio and New York in its better cultivated parts, though the hills were lower, and the beech, the chestnut and the tulip-tree were noticeably absent from the woodlands. But most of the other trees were there, the maple in abundance; and all the humbler plants, the asters, and goldenrods in the corners of the crooked fences, and those spared by the sheep and cattle feeding in the woods, had a familiar look.

The lakes and ponds abounded in species of *Potamogeton*. The shallower and more sheltered parts were covered with pond-lily plants, *Nymphaea reniformis* and *Nuphar advena*. Allusion has been made in a former article to the quantities of *P. Robbinsii* here. It almost filled the water in some places to the exclusion of other plants. The season was late for good specimens in fruit, as most of it had fallen off, but some was obtained in good condition. *P. praelongus* was also very abundant in deeper water, taking other areas quite to itself. So it may be said of *P. perfoliatus*, var. *lanceolatus*, and *P. pectinatus*, in places most suitable to their growth. Along the west side of a long point of land extending south from the railway station, *P. Spirillus* was sparingly found. I had not before seen it at the West, where it seems rare and local. One more station has been given for it in Minnesota, Prof. L. H. Bailey having found it in Long Lake, in the extreme northeastern part of the state, in 1886. I have not met with it in Michigan. Wheeler and Smith in their Catalogue of Michigan Plants credit it to the Upper Peninsula on the authority of Gray's Manual, the entry being "Lake Superior." But this is very general, and may be outside of Michigan, though there is no reason to question its presence in that state, except its rarity and the indefiniteness of the locality. Dr. Vasey has found it in northern Illinois, in McHenry coun-

ty. This and the two stations for Minnesota are the only ones concerning which I have definite information for the Upper Mississippi and the Upper Lakes within the bounds of the United States. *P. Spirillus* is a common plant in some of the small lakes of western New York. Those I have seen there were generally furnished with well developed floating leaves. In the few specimens seen in Chesago Lake, the floating leaves were rare, the plants being almost always entirely submersed. It probably occurs in other parts of the lake, but time was lacking for a thorough search. My experience shows that the habitat assigned to this plant in Gray's Manual is too exclusive in character. I have heretofore found it in small lakes, not in streams. It grows along the shallow margins of these lakes, taking the shelving beach from where the water is about a foot and a half in depth to where it shallows to three or four inches. In the latter situations it may be left bare of water for a time when the winds blow off shore. Under such conditions it grows in tuft-like masses, with short and very leafy stems, being little more than a bunch of leaves.

Some of the plants of the shore were of considerable interest. *Sagittaria heterophylla* Pursh bore stamens the length of whose filaments allied it to the section containing *S. variabilis* more than to that containing *S. heterophylla*. They were two or three times as long as the anthers, but had a lance-ovate, very glandular base. Some of the leaves were sagittate with narrow appendages. The beaks of the fruit were turned to one side, and could hardly be called erect. *Juncus pelocarpus* E. Meyer grew in the wet sands of the shore. *Cyperus Engelmanni* Steud. had spikelets considerably flattened, or quite far from terete. *Hemicarpha subsquarrosa* Nees, generally but an inch or two high, was abundant in some places. Its scales were barely recurved at the point. Nearly all of the culms bore one or two small additional involucreal leaves.

The most interesting plant of the wet shores was *Scirpus debilis* Pursh. Its flowers were uniformly characterized by two stamens, no exceptions being found as far as they were examined, and this extended far enough to establish the fact as a rule. The style was two-cleft, and all the bristles usually longer than the achenium. This was somewhat plano-convex, broadly obovate, thick, rugulose, shining, from dark brown to black in color. The stems were convex on one side

and grooved on the other, a cross section being meniscoidal rather than grooved-triangular when the stems are fresh. It was exceptional to find the involucre leaf horizontal at maturity. The stems grew in quite large tufts, much like *Eleocharis obtusa* in habit. They were from six to fifteen inches long, frequently recurved or prostrate. Though variant from the species as described, it hardly seems separable from the type, as the number of stamens either in *Scirpus* or *Eleocharis* is not constant. The present season (1890) I have found essentially the same form in two places near Chicago, at Millers and Dune Park, Ind., in the Pine Barren region. These are stations on the Michigan Southern R.R., about five miles apart, and the plants were obtained from the wet sands of the ditches skirting the railway. Considerable pains were taken to see if the flowers had more than two stamens. A dozen clusters of spikelets were selected, generally from stems borne on different roots, and three or four flowers from each cluster were examined. The style proved uniformly two-cleft, and the stamens two in number. I looked in vain for an exception, but would not affirm that it may not be found. This seemed the more curious, because in 1877 I collected *S. debilis* of the typical form only a few rods from where it was found this year at Miller's. It was along a roadway in a field beside the railroad. It was sought again in the same locality, but in vain, the grass having supplanted it, or the grazing cattle having destroyed it. An examination of the dried specimens shows that they have flowers with three stamens. It is doubtful whether the two sets of gatherings from these contiguous spots on different years are of the same group, for this constancy of difference would hardly be expected. But those of 1890, though much farther apart, are referable to the same group, since they are from the ditch along the same side of the track, though this is not continuous, being crossed or interrupted by some low ridges. But plants readily spread under such conditions. In other respects the plants were quite like those from Chesago Lake.

In the wet sands near the station at Center City *Ranunculus Flammula* L. was frequent. The stems are ascending or erect, from three to five inches high. The lower leaves are linear to oblong-linear, and from one to two inches long. The flowers are from one-fourth to one-third of an inch in diameter, with five to seven petals. This is the second time

I have come across this form of the plant, having previously seen it under similar conditions of growth at Escanaba, Mich. Upham gives Minneapolis as another station for it in the state. Its range in Gray's Manual is given as "shore of Lake Ontario, and northward." As the Manual is for the United States I suppose this means the southern shore. Macoun gives it for the Canadian shore, and "the gravelly banks of rivers to lat. 69° (Richardson.)" The Michigan and Minnesota plants are interesting as extending the geographical range farther up the Great Lakes and into the region of the Upper Mississippi. The plant evidently conforms to the var. *intermedius* in the Manual. The conditions of growth may have something to do with the erect or semi-erect habit of the stems. In both cases where found these were carefully noted and compared with those of var. *reptans*, the common form. I have always found the latter in open places, in sand or gravel quite bare of other vegetation, or with plants low or creeping like itself, and not shading it. In the var. *intermedius* the plants grew among scattered spears of grass and rushes, considerably overtopping and shading them. It could not easily lie on the ground and root at the joints, though there is sometimes a tendency to this in the lowest joint or two. The erect or ascending stems—the latter the more common position—are so slender that they could hardly support themselves if deprived of the shelter and protection of the surrounding plants, and forced into the conditions of the creeping stemmed variety. They often lean against these plants as if too weak to stand alone, and are apparently struggling upward toward the light.

Englewood, Chicago.

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## A visit to the West Indies.

A. S. HITCHCOCK.

The readers of the GAZETTE may be interested in a few of the observations made during a recent trip to the West Indies.

The expedition was organized and conducted by Dr. J. T. Rothrock, of the University of Pennsylvania, in whose yacht, the White Cap, we lived during our absence from the United States. We started from Fernandina, Florida, Nov. 4th,